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Claims

[c1] 1. A hydrokinetic torque converter assembly for use with an engine in an automatic transmission in an automotive vehicle powertrain, the transmission having friction couplings with pressure-operated actuators, the converter assembly comprising:

an impeller in a closed impeller housing;

a turbine and a stator in the impeller housing, the turbine being connected drivably to a torque output turbine shaft; and

a positive displacement pump having a pump drive member, the actuators being in controlled fluid pressure communication with the pump, the pump drive member having a central opening;

the impeller including an impeller hub defined by an impeller sleeve shaft surrounding the turbine shaft;

at least one internal flat in the central opening in the pump drive member and at least one external flat on the impeller sleeve shaft, the internal flat having a side surface in axial alignment with an end of the impeller sleeve shaft when the pump drive member surrounds the impeller sleeve shaft and the internal flat is out of registry with respect to the internal flat;

the end of the impeller sleeve shaft being sloped from a first point on the impeller sleeve shaft end to a second point on the impeller sleeve shaft end, the second point being axially spaced relative to the first point;
the side surface of the internal flat being engageable with the sloped end of the impeller sleeve shaft, whereby the internal flat moves relative to the impeller sleeve shaft toward engagement with the external flat as the impeller sleeve shaft enters the central opening of the pump drive member, whereby a driving connection is established between the impeller and the pump when the internal and external flats are in registry.

[c2] 2. The torque converter assembly as set forth in claim 1, wherein the impeller housing is connected to the engine by a yieldable drive plate;
the drive plate applying a spring force on the impeller sleeve shaft as the drive plate deflects when the torque converter is assembled with the internal flat misaligned with respect to the external flat.

[c3] 3. The torque converter assembly as set forth in claim 1, wherein the impeller sleeve shaft has two external flats and the central opening in the pump driveshaft has two internal flats;
the end of the impeller having two peripheral sloped segments, one sloped segment being engageable with a

side surface of one internal flat and the other sloped segment being engageable with a side surface of the other internal flat;

rotary motion of the impeller sleeve shaft relative to the pump drive member being accompanied by axial movement of the impeller sleeve shaft toward the pump drive member as the side surfaces of the internal flats traverse the sloped segments, whereby driving engagement of the impeller sleeve shaft and the pump drive member is established as the internal and external flats are aligned in registry.

[c4] 4. The torque converter assembly as set forth in claim 2, wherein the impeller sleeve shaft has two external flats and the central opening in the pump driveshaft has two internal flats;

the end of the impeller having two peripheral sloped segments, one sloped segment being engageable with a side surface of one internal flat and the other sloped segment being engageable with a side surface of the other internal flat;

rotary motion of the impeller sleeve shaft relative to the pump drive member being accompanied by axial movement of the impeller sleeve toward the pump drive member as the side surfaces of the internal flats traverse the sloped segments, whereby driving engagement of

the impeller sleeve shaft and the pump drive member is established when the internal and external flats are in registry.

[c5] 5. The torque converter assembly as set forth in claim 1, wherein the positive displacement pump comprises an internal gear member rotatably supported in a housing portion of the transmission and the pump drive member is an external gear member, the internal and external gear members having eccentric axes of rotation, whereby tooth spaces between the gear members define in part pump inlet and outlet ports.

[c6] 6. The torque converter assembly as set forth in claim 2, wherein the positive displacement pump comprises an internal gear member rotatably supported in a housing portion of the transmission and the pump drive member is an external gear member, the internal and external gear members having eccentric axes of rotation, whereby tooth spaces between the gear members define in part pump inlet and outlet ports.